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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/080,231	02/21/2002	Marcelo de C. Guimaraes	83669DMW	2940

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EXAMINER	
YE, LIN	

ART UNIT	PAPER NUMBER
2615	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/080,231	GUIMARAES ET AL.	
	Examiner	Art Unit	
	Lin Ye	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-18* is/are rejected.

7)☒ Claim(s) *14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 5, 7 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al. U.S. Patent 4,278,538 in view of Baer U.S. Patent 6,822,657.

Referring to claim 1, the Lawrence reference discloses in Figures 1-2 and 8-9, an electronic color image capture system for producing an accurate color reproduction of an input image, said system comprising: an imaging section (photo-detectors 32,33 and 34, See col. 13, lines 64-65) for capturing the input image and generating a plurality of color image signals from the captured image, said imaging section having predetermined spectral sensitivities defining the spectral response of the imaging section; an optical section for separating the input image into its separate color content and directing the separate color content toward said imaging section (by color filters 36, 37 and 38) as shown in Figure 9, said optical section having specific spectral characteristics which define the spectral response of the optical section; wherein the spectral responses of the optical section and the imaging section are selected so as to cascade together to provide all-positive as shown in Figure 2 (See Col. 6, lines 5-11), symmetrical system curves modeled upon red, green and blue color

matching functions representative of the human visual system (see Col. 3, lines 23-36), said color matching functions being derived from three monochromatic light sources and containing no more than three positive lobes as well as one or more negative lobes as shown in Figure 1 (See Col. 5, lines 5-51), and whereby the areas under the color matching functions determined by (a) summation of all negative lobes and (b) overlap between the green and red color matching functions are minimized (e.g., a shown in Figure 2, a new set of color matching functions summation of all negative lobes from Figure 1, the overlap between the green and red color matching functions are minimized, See Col. 8, lines 22-40 and Figure 3); and a processor including a color correction matrix with coefficients (see equations 1-18) for producing an output color image from the color image signals exhibiting an accurate color reproduction of the input image (See Col. 15, lines 47-67, Col. 16, lines 1-10 and Col. 5, lines 46-65). However, the Lawrence reference does not disclose the color correction matrix with coefficients optimized for signal-to-noise performance.

The Baer reference teaches in Figures 1-3, a processor including a color correction matrix with coefficients optimized for signal-to-noise performance for producing an output color image from the color image signals exhibiting an accurate color reproduction of the input image (Se Col. 2, lines 15-23 and Col. 5, lines 54-67). The Baer reference is evidenced that one of ordinary skill in the art at the time to see more advantages for the electronic color image capture system including a color correction matrix with coefficients optimized for signal-to-noise performance so that significantly improving image quality in the image capture system, over a wide range of signal levels. For that reason, it would have been obvious one having ordinary skill in the art at the time of the invention was made to modify

the electronic color image capture system of the Lawrence ('538) by providing a color correction matrix with coefficients optimized for signal-to-noise performance for producing an output color image from the color image signals exhibiting an accurate color reproduction of the input image as taught by Baer ('657).

Referring to claim 2, the Lawrence and Baer references disclose all subject matter as discussed with respected to claim 1, and the Lawrence reference discloses wherein the color correction matrix applied by the processor includes matrix coefficients that are selected by minimizing (a) the color difference between the color image signals and the human visual system and (See Lawrence reference's Col.8, lines 35-40 and Col. 3, lines 10-35) (b) the Baer references discloses minimizing the level of signal noise in the color image signals (See Baer's reference's Col. 2, lines 15-23 and Col. 5, lines 54-67).

Referring to claim 3, the Lawrence and Baer references disclose all subject matter as discussed with respected to claim 1, and the Lawrence reference discloses whereby the conditions that the areas under the color matching functions, as (a) determined by the summation of all negative lobes be minimized (e.g., each only have a single positive lobe, see Col. 14, lines 7-20), and (b) determined by the overlap between the green and red sensitivity curves be minimized as shown in Figure 2 comparing from Figure 1 which before the color matching functions, are constrained by the requirement that the largest possible color gamut is maintained in the output color image.

Referring to claim 5, the Lawrence and Baer references disclose all subject matter as discussed with respected to claim 1, and the Lawrence reference discloses wherein said imaging section includes an image sensor and the optical section comprises one or more

color selective components (color filters 36, 37 and 38) integrally formed with the sensor for directing image light of separate color content upon the sensor as shown in Figure 8.

Referring to claim 15, the Lawrence and Baer references disclose all subject matter as discussed with respected same comments to the claim 1.

Referring to claim 16, the Lawrence and Baer references disclose all subject matter as discussed with respected same comments to the claim 2.

Referring to claim 17, the Lawrence and Baer references disclose all subject matter as discussed with respected same comments to the claim 3.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al. U.S. Patent 4,278,538 in view of Baer U.S. Patent 6,822,657 and Juen U.S. Patent 6,459,449.

Referring to claim 4, the Lawrence and Baer references disclose all subject matter as discussed with respected to claim 1, except the Lawrence reference does not explicitly show the optical section including a beam splitter for directing image light of separate color content toward the respective image sensors.

The Juen reference teaches in Figure 1, an electronic color image capture system for producing an accurate color reproduction of an input image (See Col. 1, lines 31-47 and Col. 2, lines 38-50), said system comprising an optical section which including a beam splitter (lens-prism optical system 1, see Col. 11, lines 48-55). The Juen reference is evidenced that one of ordinary skill in the art at the time to see more advantages for the electronic color image capture system including a beam splitter for directing image light of separate color content toward the respective image sensors so that providing more flexible options to

arrange the locations of the plurality image sensors in any vary dimensions. For that reason, it would have been obvious one having ordinary skill in the art at the time of the invention was made to modify the electronic color image capture system of the Lawrence ('538) by providing a beam splitter for directing image light of separate color content toward the respective image sensors as taught by Juen ('449).

4. Claims 6 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al. U.S. Patent 4,278,538 in view of Baer U.S. Patent 6,822,657 and Usami U.S. Patent 6,160,912.

Referring to claim 6, the Lawrence and Baer references disclose all subject matter as discussed with respected to claim 1, and the Lawrence reference discloses the imaging section are selected so as to cascade together to provide all-positive as shown in Figures 2-6, However, the Lawrence reference does not explicitly show Gaussian system curves modeled upon said red, green and blue color matching functions.

The Usami reference teaches in Figure 1, an electronic color image capture system comprising a color reproduction predicting (LUT 18) correct unnatural color reproduction by a Gaussian system curves modeled upon the red, green and blue color matching function (See Col. 7, lines 30-45 and Col. 1, lines 15-23). The Usami reference is evidenced that one of ordinary skill in the art at the time to see more advantages for the electronic color image capture system including a color matching functions by utilizing Gaussian system curves so that correcting color conversion data established for a target color in an image output device, very easily and highly accurately (See col. 2, lines 30-35). For that reason, it would have

been obvious one having ordinary skill in the art at the time of the invention was made to modify the electronic color image capture system of the Lawrence ('538) by providing Gaussian system curves modeled upon said red, green and blue color matching functions as taught by Usami ('912).

Referring to claim 18, the Lawrence, Baer and Usami references disclose all subject matter as discussed with respected same comments to the claim 6.

5. Claims 7, 8 and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al. U.S. Patent 4,278,538 in view of Baer U.S. Patent 6,822,657 and Giorgianni et al. U.S. Patent 5,609,978.

Referring to claim 7, the Lawrence and Baer references disclose all subject matter as discussed with respected to the claims 1and 2, except that the Lawrence reference does not explicitly show a color correction matrix containing matrix coefficients that are selected by minimizing at least two error measuring parameters including one parameter measuring the color difference between the color image signals and the human visual system and the other parameter measuring the level of signal noise in the color image signals.

The Giorgianni reference teaches a color correction matrix containing matrix coefficients that are selected by minimizing at least two error measuring parameters including one parameter ($\overline{\Delta E_{ab}}$*) measuring the color difference between the color image signals and the human visual system (See Col. 5, lines 37-55), and the other parameter (ψ_N) measuring the level of signal noise in the color image signals (See Col. 8, lines 5-50). The Giorgianni reference is evidenced that one of ordinary skill in the art at the time to see more advantages

for the electronic color image capture system including a standard color correction matrix (CIE 1976) to contain matrix coefficients that are selected by minimizing at least two error measuring parameters including one parameter measuring the color difference between the color image signals and the human visual system and the other parameter measuring the level of signal noise in the color image signals, so that can significantly improve the colorimetric accuracy (See Col. 11, lines 40-65). For that reason, it would have been obvious one having ordinary skill in the art at the time of the invention was made to modify the electronic color image capture system of the Lawrence ('538) by providing a color correction matrix containing matrix coefficients that are selected by minimizing at least two error measuring parameters including one parameter measuring the color difference between the color image signals and the human visual system and the other parameter measuring the level of signal noise in the color image signals as taught by Giorgianni ('978).

Referring to claim 8, the Lawrence, Baer and Giorgianni references disclose all subject matter as discussed with respected same comments to the claims 3 and 7.

Referring to claim 10, the Lawrence, Baer and Giorgianni references disclose all subject matter as discussed with respected to the claim 7, and the Giorgianni reference discloses wherein the error measuring parameter measuring the difference between the color image signals and the human visual system is $\overline{\Delta E_{ab}}^*$, which is calculated according to:

$\overline{\Delta E_{ab}}^* = \frac{\sum_{i=1}^{N} \Delta E^*_{ab,i}}{N}$ where the color difference value $\Delta E^*_{ab,i}$ for a diagnostic color patch set containing N (e.g., N= 190) patches is calculated for the difference between the 1976 CIE (L*a*b*)-space (CIELAB space) coordinates for each patch and the 1976 CIE (L*a*b*)-

space coordinates which correspond to a transformation of the exposure signals captured by the image sensors (see Col. 7, lines 60-65).

Referring to claim 11, the Lawrence, Baer and Giorgianni references disclose all subject matter as discussed with respected to the claim 10, and the Giorgianni reference discloses wherein $\overline{\Delta E_{ab}}^* \leq 2.5$ (e.g., the Giorgianni reference discloses in Table 1, when the color photographic light sensitive material is MacAdam, the $\overline{\Delta E_{ab}}^* = 0.1$, see Col. 11, lines 15-30).

Referring to claim 12, the Lawrence, Baer and Giorgianni references disclose all subject matter as discussed with respected to the claim 7, and the Giorgianni reference discloses wherein the parameter measuring the level of signal noise in the color image signals is a parameter ψ_N defined as the sum of the square roots of the sum of the squares of the matrix coefficients of each row in the color correction matrix which transforms the color image signals (See Col. 8, lines 40-50).

Referring to claim 13, the Lawrence, Baer and Giorgianni references disclose all subject matter as discussed with respected to the claim 12, and the Giorgianni reference discloses wherein $\psi_N \leq 3.5$ (e.g., the Giorgianni reference discloses in Table 1, when the color photographic light sensitive material is color Reversal Film #1 or Colr negative Film #1, $\psi_N \leq 3.5$, see Col. 11, lines 15-30).

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al. U.S. Patent 4,278,538 in view of Baer U.S. Patent 6,822,657, Giorgianni et al. U.S. Patent 5,609,978 and Juen U.S. Patent 6,459,449.

Referring to claim 9, the Lawrence, Baer, Giorgianni and Juen references disclose all subject matter as discussed with respected same comments to the claims 4 and 7.

Allowable Subject Matter

7. Claim 14 is objected to as being dependent upon a rejected base claim 7, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

For claim 14, the prior art does not teach or fairly suggest the Gaussian system curves is described by two parameters, as shown in the following equation:

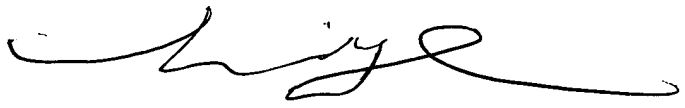
$F_k(\lambda) = e\left(\frac{\lambda-\overline{\lambda_k}}{2\sigma k}\right)^2$ where k represents each of the three channels (r, g, b), $\overline{\lambda_k}$ is the mean value of the Gaussian curve corresponding to channel k and σ_k is the standard deviation value corresponding to channel k and the following set of parameters defines a set of Gaussian curves that best matches the red, green and blue color-matching functions $\overline{\lambda_R}$=600 nm, $\overline{\lambda_G}$=550 nm, $\overline{\lambda_B}$=450 nm, σ_R=75 nm, σ_G=65nm, σ_B=60 nm, used in combination with all of the other limitations of the claim 7.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lin Ye whose telephone number is (571) 272-7372. The examiner can normally be reached on Mon-Fri 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lin Ye
Examiner
Art Unit 2615

August 19, 2005